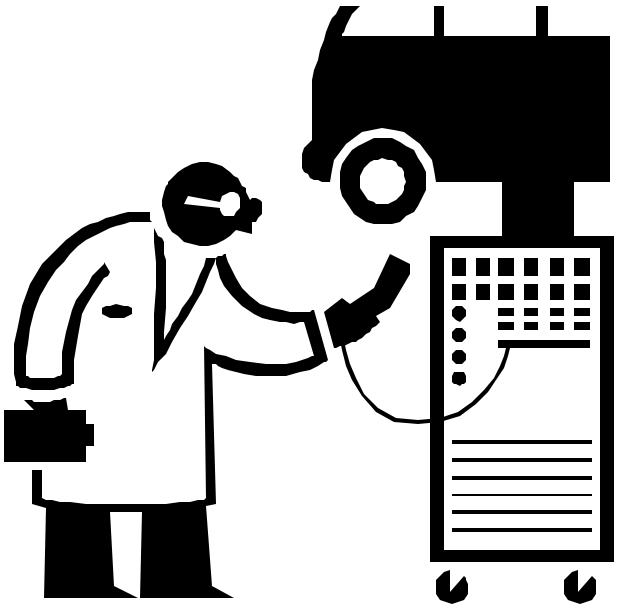
CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
AIR RESOURCES BOARD

STAFF REPORT

THE EXEMPTION OF ADDITIONAL VEHICLES FROM SMOG CHECK



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EXECUTIVE SUMMARY

Assembly Bill 2637 (Stats. 2002, Chapter 1001), signed by the Governor in September 2002, establishes an Enhanced Smog Check program in the San Francisco Bay Area Air Basin. As part of the law, the current four-year Smog Check exemption for new motor vehicles would be extended statewide to six years with the goal of minimizing the burden of the program on vehicles less likely to fail an inspection. The increased exemption is to become effective in all Basic and Enhanced Smog Check areas unless the ARB finds that exempting the additional vehicles would prohibit the State from meeting the requirements of the section 176(c) of the federal Clean Air Act or California's commitments with respect to the State Implementation Plan (SIP).

This report presents an analysis conducted to examine the impact of the proposed expanded exemption. It is intended to provide the Board with the information it needs to make the air quality impact finding called for in AB 2637.

The results of the analysis are that either a five or six year exemption for new vehicles would result in a significant increase in ozone forming emissions throughout areas designated for the Enhanced Smog Check Program. The magnitude of the increase would present a significant barrier towards achievement of California's air quality commitments. Therefore, the staff proposes that the Board approve its report and find that a fleet-wide exemption for new motor vehicles beyond the current four years would result in adverse emission impacts that would prohibit the State from meeting California's SIP commitments in Enhanced Smog Check areas. In Basic Smog Check areas, the staff proposes that the Board find the exemption would not prohibit the State from meeting California's SIP commitments.

If the Board approves the findings proposed by staff, the exemption would not increase beyond the current four years in Enhanced Smog Check areas, but would increase to five and six model year vehicles in Basic Smog Check areas. In addition, as explained in the body of this report, staff believes opportunities may exist in Enhanced Smog Check areas for more targeted newer vehicle exemptions focusing on vehicles determined to be far less likely to benefit from an initial inspection after four years in comparison to the overall five and six year old fleet.

The Exemption of Additional Vehicles from Smog Check
April 2, 2003

BACKGROUND

Assembly Bill 2637, by Assemblyman Dennis Cardoza (D-Merced), was passed by the Legislature August 28, 2002, and was signed by Governor Davis on September 27, 2002. The measure took effect January 1, 2003.

AB 2637 requires the establishment of an Enhanced Smog Check Program in the urbanized areas of the San Francisco Bay Area Air Basin (Bay Area). The Bay Area Air Basin includes the counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara, and portions of Solano and Sonoma. The Enhanced Smog Check Program includes loaded-mode (dynamometer-based) testing, as well as the direction of selected vehicles to Test-Only stations in the urban parts of these counties.

The bill requires the Bureau of Automotive Repair (BAR) to launch the enhanced program in the Bay Area once an adequate number of test-only stations, test and repair stations, referee services, and other necessary facilities and equipment are in place to provide reliable and convenient service to vehicle owners. BAR's goal is to have licensed Smog Check stations begin testing vehicles in the Bay Area using the BAR-97 test instrument platform by July 1, 2003. Dynamometer-based testing is scheduled to begin October 1, 2003.

In addition to the above, AB 2637 amends Section 44011(a)(4)(B) of the California Health and Safety Code to extend the new vehicle exemption from the state's Smog Check Program for up to an additional two years (i.e. for the first six years instead of just four). The model year exemption for new vehicles does not apply upon change of ownership or if a vehicle is being registered in California for the first time. Any motor vehicle that is 30 or more model-years old is exempt from Smog Check.

The additional two year exemption for the biennial Smog Check Program was included in the law based on a preliminary emissions analysis which indicated that the reduction in Smog Check emission benefits might not be significant. The increased exemption is to become effective in all basic and enhanced Smog Check areas beginning January 1, 2004, unless the ARB finds that exempting the additional vehicles would prohibit the State from meeting the requirements of the section 176(c) of the federal Clean Air Act or California's commitments with respect to the State Implementation Plan.

Since the enactment of the legislation, a detailed analysis of the emissions impact of extending the new vehicle exemption from four to six years in Enhanced Smog Check areas has been performed by a consultant. This report summarizes the results of the analysis, and the staff's recommendations on the appropriateness of proceeding with increased new vehicle exemptions.

IMPACT OF EXEMPTING FIVE AND SIX YEAR OLD VEHICLES

The consultant analyzed currently available data to estimate the loss in emission benefits expected to occur as a result of extending the new vehicle exemption. Both exhaust and evaporative emissions impacts were considered in the evaluation. The analysis focused on those areas of the state with Enhanced I/M Acceleration Simulation Mode (ASM) dynamometer testing already in place or expected by January 2004 (and thus includes the San Francisco Bay Area). As discussed in the Technical Support Document (TSD), the detailed data analyzed were derived from several sources.

The primary source of data was approximately 13,000 emission tests collected statewide during random pull-over inspections conducted by BAR. These data were collected from 2000 through 2002, and included dynamometer emission tests at the roadside and physical inspections of the vehicles. An additional 2,000 emission tests performed at the ARB's Haagen-Smit Laboratory were also used in the analysis.

Analysis of data obtained from Arizona and Wisconsin's inspection programs confirmed the exhaust failure rates observed in California's roadside data. Data from Arizona's evaporative pressure tests were used directly in calculating evaporative emission rates (California has not yet implemented an evaporative pressure test; this analysis assumes that California will have an low pressure evaporative test in place before 2005 that is at least as effective as Arizona's). For 1995 and newer vehicles subject to the enhanced evaporative test procedures, pre-inspection failure rates were based on an analysis of the OBD II roadside data.

The analysis of the data was performed in calendar year 2002. Emission rates from all tests were used to create an overall baseline fleet emission value. By identifying those five and six year old vehicles (1998 and 1997 models) that would fail a smog inspection, fleet emission rates with and without five and/or six year old vehicles exempted from inspections were calculated. The difference in fleet emission rates as a percentage increase was applied to the baseline ton per day (tpd) emission results calculated by the EMFAC2002 model to determine the statewide loss of emission reductions from exempting five and six model year vehicles from inspections. The analysis methodology is similar to the approach that staff used in the July 2000 evaluation of the Smog Check II program.

The analysis assumes that the exempt vehicles would still be subject to a change of ownership inspection. A 17 percent annual change of ownership rate was used in the analysis.

Exemption Results

The results indicate that extending the new vehicle exemption for an additional one or two more years is projected to significantly increase vehicle emissions in Enhanced I/M areas. Exempting both five and six year old vehicles will increase emissions by about four tpd of ROG and NOx in 2005. Exempting only five year old vehicles would

increase 2005 calendar year emissions by nearly two tpd in Enhanced I/M areas. The results of the analysis are presented in Table 1.

The emission increases resulting from additional Smog Check exemptions are lower in 2010 due to the lower baseline emission levels. However, a five or six year exemption is still estimated to increase ozone-forming emissions by one to three tpd, respectively.

Table 1 - Emissions Impact from Five and Six year Smog Check Exemption**

	Enhanced Area Emissions (tons per day)					
	Reactive Organic Gases (ROG)			CO	NOx	ROG+NOx
	Exhaust	Evap.	Total			
2005 Baseline *	259	242	501	5,013	507	1,008
Increase: 5 year exempt.	0.10	0.59	0.69	4.95	1.08	**1.77**
Increase: 6 year exempt.	0.51	1.19	1.70	13.12	2.01	**3.71**
2010 Baseline *	167	194	361	3507	344	705
Increase: 5 year exempt.	0.07	0.47	0.54	3.44***	0.73	**1.27**
Increase: 6 year exempt.	0.33	0.95	1.28	9.18	1.36	**2.64**

*Baseline - Light-Duty Vehicles subject to Smog Check
**Some exact values rounded to preserve table integrity.
***The originally stated value was 3044 tpd, the correct value is 3.44 tpd.

Costs and Cost Effectiveness

Using average Smog Check inspection and repair costs, the total cost of retaining five and/or six year old vehicles in the enhanced program was analyzed. These costs were then compared to the corresponding emission benefits of five and six year inspections to determine the cost effectiveness of keeping these vehicles in the program. The results are summarized in Table 2.

Table 2 - Five and Six Year Smog Check Costs and Cost Effectiveness

	Retain Five Year Old Vehicles	Retain Six Year Old Vehicles
Total Annual Costs ($ millions)	63	122
ROG and NOx benefits (tons / I/M cycle)	1,416	2,709
Cost Effectiveness	$44,324 / ton	$44,858 / ton

The cost effectiveness of allowing a five or six model year exemption is at the high end compared to past emission control measures. However, the staff anticipates that further on-road control strategies intended to make up the benefits lost through added

exemptions would be hard to achieve in a comparable cost-effective manner. Further, realization of the benefits would be delayed until the new control measures took effect. As discussed below, these emission reductions are critical for meeting California's air quality goals.

IMPLICATIONS ON THE SIP

In November 1994, California submitted to the U.S. Environmental Protection Agency (U.S. EPA) a comprehensive SIP, detailing how six areas of the state -- San Diego County, the San Joaquin Valley, Ventura County, the Sacramento Region, the Southeast Desert, and the South Coast -- would attain the one-hour federal ozone standard by the statutory deadlines. Enhanced Smog Check was a critical element of the 1994 SIP; in fact, it was responsible for a quarter of the emission reductions needed by 1999. San Diego and Ventura are relying on the full benefits of the Enhanced program in place today; the South Coast, San Joaquin Valley, Southeast Desert, and Sacramento need further reductions from the program to help attain this standard.

The Bay Area is transitioning from Basic to Enhanced Smog Check under the provisions of AB 2637. The SIP for this region includes a State commitment for additional emission reductions through a more effective Smog Check program that the one in place today.

In addition to being a key strategy for attaining the one-hour ozone standard, Smog Check will also be important in helping the State attain the new, more stringent federal standards for eight-hour ozone and fine particulate matter. California will also rely on Smog Check to help maintain progress toward State air quality standards.

In July 2000, the ARB and the BAR released a report that concluded Enhanced Smog Check was achieving emission reductions, but was not fully meeting the SIP commitment. In August 2000, the ARB and the BAR committed to implement additional Smog Check improvements to remedy the shortfall. The ARB and the BAR have yet to implement all the Smog Check improvements committed to in August 2000. Consequently, in order to meet the existing Enhanced Smog Check SIP commitment, California must preserve and improve the program.

The ARB is scheduled to act on a number of SIP revisions in the next year, including the 2003 South Coast SIP for ozone and particulate matter. The draft 2003 South Coast SIP contains defined State and local control measures to cut emissions, as well as a broad commitment to achieve an additional 350 tpd of ROG and NOx reductions by 2010. Even control measures that achieve about one-tenth of a tpd, or less, are being considered. Achieving the additional 350 tpd of reductions by the 2010 attainment deadline will pose a significant challenge to the ARB, South Coast Air Quality Management District, Southern California Association of Governments, and U.S. EPA.

The ARB also expects to act on a new San Joaquin Valley Air District ozone SIP within the next year. Like the South Coast SIP, the San Joaquin Valley plan is expected to contain ambitious targets for ROG and NOx emission reductions. According to

preliminary estimates, staff expects that the plan will require approximately a 30 percent overall reduction in ROG and NOx emissions.

In conclusion, exempting five and six year old vehicles from the Enhanced program would prevent the State from meeting its Smog Check SIP commitment and make it harder to show attainment of air quality standards in areas such as the South Coast and San Joaquin Valley. The staff believes any lost benefit on the order of one tpd or more would be unacceptably large, given the need to achieve every feasible emission reduction from this program.

However, the exemption for five and six year old vehicles could be extended in Basic Smog Check program areas without jeopardizing the existing SIP. Basic Smog Check is currently in place in most other areas of the state with lower pollution and population. Many of these areas have already attained the federal one-hour ozone standard (as well as the carbon monoxide standard). These regions are covered by SIPs demonstrating how they will maintain compliance with the standards for the next decade. For example, the maintenance SIPs for Santa Barbara, Monterey, and Lake Tahoe include the Basic Smog Check program, but the benefits from other adopted ARB regulations would ensure that the State continues to meet its SIP obligations even if the Basic program exemption is extended to five and six model year vehicles. For Basic Smog Check areas, therefore, the staff is not able to find that providing an exemption for five and six model year vehicles would prohibit the State from meeting California's SIP commitments, as specified in Health and Safety Code Section 44011(a)(4)(B).

OPTIONS TO MITIGATE IMPACT

Although the projected adverse emissions impact of a fleet-wide five or six year new vehicle exemption is unacceptably large, the staff believes that more limited additional exemptions within the population of five and six year old vehicles may be warranted. It may be possible to identify subsets of the five to six year old vehicle fleet that will not benefit significantly from their initial smog check, based on demonstrated emissions durability and other factors. Possible examples are discussed below.

- **Partial Zero Emission Vehicles (PZEV)**

PZEV certified engine families are a good example of vehicles that should exhibit very limited benefits from a Smog Check in the five to six year time frame. To be certified as a PZEV, a vehicle must meet the ARB's stringent exhaust emission standards, have zero evaporative emissions, and be covered by an emissions warranty for 15 years or 150,000 miles, whichever comes first. These vehicles have fully functioning OBD II systems, which will identify virtually all causes of excess emissions. Vehicle owners will be notified of emission-related malfunctions through a dashboard warning light. Because emission-related repairs for PZEV vehicles will be covered under warranty through the exemption period, unlike conventional vehicles, it is expected that most vehicle owners will seek prompt repair of problems that occur. Thus, the benefit of a Smog Check while these vehicles are under warranty is expected to be minimal.

The number of PZEV vehicles available for sale in California is becoming significant. For the 2003 model year, seven manufacturers have certified a total of eight PZEV models. According to 2003 projected sales information provided by these manufacturers, total 2003 PZEV production is expected to be approximately 140,000 in California. PZEV production in future model years is expected to continue to increase. Because the PZEV category is essentially new with the 2003 model year, the added exemption for these vehicles wouldn't actually begin until calendar year 2007. For this reason, the staff recommends that a decision on exempting five and six year old PZEV vehicles from Smog Check be deferred until in-use experience with these vehicles is available.

- **Using Remote Sensing Technologies to Identify Low Emission Vehicles**

The ARB and the BAR are developing a pilot study to assess the effectiveness of remote sensing technology as a supplemental tool to enhance California's I/M Program. Remote sensing technology will be evaluated to determine if it is effective in identifying individual or groups of low emitting vehicles. If effective, these vehicles could be exempted from their fifth or sixth year inspection. The ARB released its "Request For Proposals" for a contract to carry out this study earlier this year. The study will be completed by May 2005.

- **Profiling Vehicles Based on BAR's Database**

Another possible way to exempt vehicles is to identify lower emitting five and six year old models at the manufacturer level. The BAR database can be used to identify manufacturer-specific models that have historically had extremely high inspection pass rates. This could be an indicator that newer models using similar engine and emission controls would also have high pass rates, and could skip an inspection cycle without a significant loss in emissions benefit. The BAR has begun evaluating this approach, and could implement additional exemptions on a pilot basis in 2004.

RECOMMENDATION

The staff has reviewed the requirements of AB 2637 and has investigated the emissions impact of increasing the Smog Check exemption to either five or six model years for new motor vehicles. The analyses show that significant, adverse emissions impacts would result in Enhanced Smog Check areas from increasing the exemption to either five or six model years. Therefore, the staff proposes that the Board approve its report and find that a fleet-wide exemption for new motor vehicles beyond the current four years would result in adverse emission impacts that would prohibit the State from meeting California's SIP commitments in Enhanced Smog Check areas. In Basic Smog Check areas, the staff proposes that the Board find the exemption would not prohibit the State from meeting California's SIP commitments. If the Board approves the findings proposed by staff, the exemption would not increase beyond the current four years in Enhanced Smog Check areas, but would increase to five and six model year vehicles in Basic Smog Check areas.

Although the staff has concluded that an exemption from Smog Check of all five or six year old vehicles would increase emissions, staff believes that exemptions of a subset of these vehicles may be possible in Enchanced Smog Check areas with reduced adverse emission impacts. For example, it may be possible to exempt certain groups of vehicles (such as PZEV) whose emission characteristics and extended warranty period suggest few vehicles would fail an inspection. It may also be possible to exempt individual vehicles, or groups of vehicles, based on roadside measurements or based on historical records collected by the BAR. Studies are underway to establish the effectiveness of these approaches.